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ABSTRACT

This paper discusses the rationale for a cross-cultural (Israeli-American) study of the cognitive effects of the television media on children. The overall purpose of the study are: (1) to examine the extent to which exposure to television has an effect on children's mastery of cognitive skills; and (2) to examine the extent to which activities of "encoding" (activities through which children communicate their ideas via television or film) have instructionally desirable effects on the mastery of cognitive skills. In this paper, three questions are examined: the first pertains to the conception of media "language" formats as they theoretically relate to mental skills; the second question, to the identification of cricial "language" formats; and the third, to the identification and measurement of the relevant mental skills. Two versions of an experimental film have been developed, and a battery of measures for the study have been prepared. (CS

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Introduction

The major purposes of the project were twofold. (a) To examine the extent to which exposure to television, and more specifically - to the "language" structure of the medium, has an effect on children's mastery of cognitive skills pertaining to the demands and to the mentally supplanting models of the medium. This was planned as a cross-cultural correlational study in which Israeli and American children were to be tested. (b) To examine the extent to which activities of "encoding", that is - activities through which children communicate their ideas via television or film, have instructionally desireable effects on the mastery of cognitive skills. This was planned as a field experiment in the schools.

Research activities were planned to begin on October 1, 1973, with the first phase of the study, namely - the identification of salient television "language" formats. This was expected to lead to the identification of related mental skills.

Two factors were responsible for changes in the originally planned activities. The first was the October War which broke out six days after the initiation of the project and which halted most activities until the beginning of March, 1974. The second factor was more intrinsic to the nature of the project. While deliberating about the correspondence between television's "language" formats and related mental skills, the conclusion was reached that a number of essential assumptions could not be accepted on face value and needed, therefore, empirical testing. Since this issue became rather central to the activities of the project we will describe them

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in more detail.

Media and Cognition: Revisited

The notion that different "language" formats of media engage different mental modes of information extraction and processing, can be accepted on the basis of available evidence as a general principle. However, when specifics are considered one is hard put to specify what particular "language" format relates to what particular mental skill. Furthermore, the nature of this relationship needs exact explication as it would be impossible otherwise to generate hypotheses as to the way specific media attributes affect specific cognitive skills. It is in this respect a problem related to the more general issue of culture and cognition. Whereas it is agreed that culture cultivates thought processes, the researcher is challenged to identify specific links between cultural experiences and cognitive outcomes (e.g. Goodnow, 1969).

This issue entails also a methodological aspect. Assume that our cross-cultural study has been done and no residual correlation between exposure to television and mastery of mental skills has been found. Before accepting the null hypothesis of no cognitive effects of exposure to television, one should consider rival hypotheses. Thus, e.g., may not the absence of results be caused by the measurement of the wrong mental skills? Or may it not be due to the identification of the least significant "language" components of the medium? Not knowing in advance that the identified "language" formats are indeed the crucial ones, and that the measured mental skills are the relevant ones, could prevent us from ruling out such rival hypotheses.

To avoid this in advance, three questions need to be answered. The first pertains to the conception of media "language" formats as they theoretically relate to mental skills. The second question pertains to the identification of crucial "language" formats. The third question pertains to the identification and measurement of the relevant mental skills.

As for the question of media formats as they relate to mastery of mental skills, the following conception has been advanced by us. The "language" formats of media are to be conceived of as codes (Worth, 1969). As such, they impose particular modifications on the "raw" (i.e. still uncoded) idea.

Once the idea is coded, hence - undergone modifications, it becomes a message whose content needs to be extracted and processed. In fact, there are no uncoded, or "raw" messages in existence. Every communication act, where an idea is mediated, entails coding. Only the natural surrounding is uncoded. But then, once responded to, stored, processed, etc. a mediating code is imposed on it by the person interacting with it.

Where media are involved, thus where socially agreed upon codes are used such that "raw" ideas are modified by them, two levels of cognitive competency appear to be involved. The first level entails the acknowledgement that modifications are involved. That is the level at which sign is distinguished from signified and representation from presentation. This has been described by Gross (1974) as the "awareness of the operations and transformations involved in coding ... messages and activities" (p. 63). At this level one expects a child to be able to distinguish between a drawing of an object and the object itself, or between the nature of time in films and real time.

The next level concerns the ability to decode, that is - to reverse, correct or transform the modifications caused by a code. Thus, for example, one is called upon to close logical gaps caused by the editing of film, to perceive elevation in a flat map, to create a cognitive map of a chain of events presented as fragments in a television program, or to transform a verbal statement into a figurative image. Whereas the first level of competency described above is universal, the second level is medium-specific. While being able to encode the codes of one medium, one may be unable to do the same with another with which he is unfamiliar.

Mastery of the skills which are called upon by a code for decoding purposes enables one to better extract knowledge and meaning from a message (see, for instance, the findings in Salomon, 1974a). This level of skill mastery may thus be labelled "media literacy". It pertains to the mastery of highly specific skills which facilitate and serve the extraction of knowledge.

However, such a skill could possibly become generalized as a result of frequent and reinforcing usage. The frequency is determined by the amount of exposure to a medium which calls upon the particular skill; the reinforce-

ment is determined by the subjective success of knowledge extraction.

When "media literacy" skills are generalized, schematized and applicable to new materials, one can speak of the cultivation of skills by the medium. Such, for instance, is the case with regard to the development of generalized patterns of perceptual exploration which appear to result from the skills called upon by reading (Kugelmass, Lieblich & Ehrlich, 1972). It is this level of developed competency which is the focus of our cross-cultural study.

However, we have reasoned, skill development may be a result of still another mechanizm. Some media codes which function as explicit models to supplant internal processes may be imitated, internalized, schematized and used as "mental tools" which are applicable to new instances (Salomon, 1972; 1974b; Rovet, 1974). It is still unclear, though, how this mechanizm relates to the above mentioned one.[1]

Having placed the issue of media formats, or codes, and skill cultivation in a wider conceptual framework, we could turn to our two other questions.

Critical Formats and Related Skills

The second question we needed to answer pertained to the identification of critical television formats which we could consider as possible cultivators of skills. This, in turn, should lead us to the identification of the skills-to-be-affected.

Lengthy deliberations have led us to define critical television formats as those which fulfill the following conditions:

(1) A critical format changes the appearance of a message.

(2a) The format affects the meaning extracted from the message, thus, two different meanings would be extracted from one and the same message if coded in two different ways,

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[1] There is, however, systematic evidence to show that while low-ability children imitate supplanting formats, better able ones develop when skills are called upon.

and/or:

(2b) Whereas the meanings extracted from a message differently coded may be the same on some occasions, the mental processes involved must be different. Thus, whereas the number 22 may be of the same meaning as "XXII" or "twenty-two", the mental processes which lead to that meaning are different.

A format is critical if at least conditions (1) and (2b) are met.

Examinations of television programs as well as a survey of the relevant literature have yielded a list of television formats which we have reason to believe are critical according to the above conditions. Particular mental skills, which we hypothesize to be either called upon or supplanted by the formats, were then identified in relation to each format. The temporary results of these deliberations are given below.[2]

(a) Critical formats related to the notationality of the television message

In spite of the observed fact that television carries more verbal messages per unit time than, say, film, its unique and critical attribute is the non-notationality (pictorial) appearance. The television messages are also very concrete, in terms of their appearances, a limitation frequently noted with regard to film and television in general.

Research on Imagery (e.g., Paivio, 1971) and recent research on the way children interpret television shows (Gross, 1974) suggest two skills which might be affected by the pictorial and the concrete nature of the medium's messages. It could be hypothesized that both imagery ability and inference making ability may be related to these formats. Imagery ability may be affected either because a ready model is provided by television or because of the concreteness of the messages, which has been found to arouse imagery. Inference making ability, on the other hand, is clearly a skill which is called upon, and hardly ever modeled by television.

(b) Critical formats related to the shot

The shot (or in Worth's words, the "edeme") is perhaps best characterized by the way the camera is employed. One highly typical format is the zoom of

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[2] Dr. David Feldman of Yale, and presently of Tufts, was of much help in defining the skills mentioned below.

the camera lens, another is the close-up, and a third is the changing point of view.

The zoom and the close-up are complementary formats. Both deal with the relationships between selected parts of a visual field and between parts and wholes. The latter could be visual wholes (a whole field of vision) or conceptual-inferential. However, whereas the zoom overtly supplants those relations, thus models a process, the close-up calls upon it. Inability to bring the skill of interrelating parts and wholes to bear upon close-ups, would hinder the proper extraction of meaning.

Two skills were identified as possibly being related to the above formats: Ability to relate parts to perceptual wholes (studied in Salomon, 1974a), and the ability to relate parts to inferred wholes.

The changing point of view of the camera can be conceived of as supplanting the process needed when seeing somebody else's point of view (Salomon, 1974a). Development of that ability has been studied by Piaget (Piaget & Inhelder, 1956) and recently by Hoy (1974). The question of its being affected by television supplantation has been studied, however, on pilot grounds only.

(c) Critical formats on the level of sequences

When shots are combined into strings, or sequences, other formats can be identified. Among them we find mainly two: The fragmentation of space and the creation of plot, or logical gaps. As these formats have been described in detail in the literature (e.g. Spottiswoode, 1965; Worth, 1969), we will not dwell on them here. In both cases specific skills may be called upon. In the case of the fragmented space one needs to coordinate the spatial fragments such that a unit common space, in which the events take place, is constructed by him. In the case of the logical gaps, one has to go beyond the information given and close the gaps by supplying his own information such that missing details, cause and effect relations, etc. are available. However, unlike the above mentioned inference making which calls for vertical inferences, closing logical gaps requires lateral inferences (de Bono, 1971).

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(d) Critical format on the level of programing

A child does not view a sequence or even a single program. He watches a succession of programs which is perhaps best described by the format of quick changes of plot, place, type of message, intend, figures, etc. In other words, it is characterized by high variability. As a matter of fact, high variability is not typical only of programing, in which commercial interruptions add much to the amount of variability, but it appears also within programs. Programs such as Sesame Street or the Electric Company utilize this format to its extreme.

High variability was conceived by us as a format in which interrelating parts is not called for. On the other hand, one has to process much information in a relatively short time within each part or unit. Two skills were thus identified as being possibly related to this format: Speedy processing of condensed information presented in a unit of time and space (Archer, 1954), and one's avoidance of interrelating discontinuous parts. The latter is clearly in conflict with the need to close logical gaps described above. Moreover, it may run counter to the natural development of the child. Thus, it is not clear to us as yet whether the format of variability hinders the development of processing messages by interrelating them or whether it develops (by calling upon) a different skill better suited to handle such messages.

Variability may, in addition, have an affect on what might be seen as a style, rather than skill. As has been found in a study accompanying the Israeli investigation of Sesame Street, this format may model an impulsive style. The rapid shifts may be imitated by some children and contribute to their (already existing) tendancy not to stick to an issue, not to persevere. This format may also facilitate the preference for the complex and varied as studied, for instance, by Barron (1966). The target of such an effect would also be considered as a cognitive style rather than skill.

The formats, skills and styles mentioned above are, of course, only hypothetical. Thus, we felt the need to examine their validity under favorable experimental conditions as a preliminary step.

The New Experiments

The major questions we had to answer empirically were whether the identified formats meet our conditions and whether the identified skills are indeed relevant to the handling of the formats. "Relevancy" means, in this respect, that mastery of a skill is correlated with the extraction of knowledge from a message coded in a particular format, but not with the extraction of knowledge from another format.

This, then, led us to construct a series of experimental conditions in which groups of children are shown a television film, and their initial levels of skill mastery are then correlated with their knowledge and comprehension of the film. Each group of children is to see one version of that film. The versions differ from each other in only one respect: Each employs a different format. Thus, there is a version which frequently employs close-ups, other versions employ the zoom, fragmented spaces or logical gaps. Another group of children is shown a basic no-format version, i.e. it imposes on the messages no particular format, as much as possible (clearly, particular formats such as concreteness, pictoriality and the like, appear in all versions). Still another film (necessarily with a different plot) is based on the format of variability. It contains, in fact, six plots of about three minutes long each.

All children are given a battery of pretests which includes measures of the skills described above, as well as a measure of general intelligence. All children are given also a shorter posttest battery which measures different aspects of knowledge of the film.

If we have identified critical formats (only a sample of which are represented in the experiments) and if the relevant skills are measured, then we should find mastery of the skills to correlate with aspects of knowledge differently for each version. For instance, the ability to relate part to whole should correlate with one of the aspects of knowledge in the close-up version, but not in the others.

Obviously, the experimental versions emphasize specific formats and thus create favorable conditions. We reason, however, that if the expected correlations are not obtained under such favorable conditions, then wrong formats or wrong skills have been identified, and they should not be

included in the cross-cultural study. Obtaining the expected correlations would not make the cross-cultural study unnecessary, but would enable us to better interpret its results.

These experiments may provide, in addition, also theoretically useful evidence to support the more general thesis pertaining to the relationship between media codes and mental skills.

Presently, the different versions of the film, which we have shot, are ready. The different tests of the skills receive their final touches (sample items are attached) and the necessary six classrooms of sixth graders have been obtained. Experimentation should start in October 1974. Analysis of data and preparation of the battery of measures for the cross-cultural study should last until March 1975. Thus, the cross-cultural study should take place in April 1975.

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